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Asterolibertia moquileae comb. nov. on *Licania tomentosa* from Brazil

Jose Luiz Bezerra*[1,2], Sílvia Patrícia Barbosa Araújo[2],
André L. Firmino[3] & Jadergudson Pereira[2]

[1] *Universidade Federal do Recôncavo da Bahia, Centro de Ciências Agrárias, Ambientais e Biotecnológicas, Rua Rui Barbosa 710, 44380-000, Cruz das Almas, Bahia, Brazil*

[2] *Universidade Estadual de Santa Cruz, Departamento de Ciências Agrárias e Ambientais, Programa de Pós-Graduação em Produção Vegetal, Rod. Jorge Amado, km 16, 45662-900, Ilhéus, Bahia, Brazil*

[3] *Universidade Federal de Viçosa, Departamento de Fitopatologia, 36570-900, Viçosa, Minas Gerais, Brazil*

* Correspondence to: *jlulabezerra@hotmail.com*

Abstract — Two asterinaceous fungi, *Cirsosia moquileae* and *Wardina moquileae*, described on *Licania tomentosa* from Brazil, were determined to be conspecific by examination of their type specimens. A new combination, *Asterolibertia moquileae*, is proposed based on *Cirsosia moquileae*, with *Wardina moquileae* as a heterotypic synonym.

Key words — *Ascomycota*, *Asterinaceae*, systematics

Introduction

The genera *Wardina* G. Arnaud and *Asterolibertia* G. Arnaud were described in 1918, separated by the artificial criterion of presence or absence of pseudoparaphyses. The type of *Asterolibertia*, *A. couepiae* (Henn.) G. Arnaud, was masterfully illustrated by Arnaud (1918) showing dimidiate-scutellar, orbicular ascomata with stellar dehiscence, radiate upper wall and mycelium with intercalary hyphopodia (appressoria). Müller & Arx (1962) considered the type of the genus *Wardina*, *W. myocoproides* (Sacc. & Berl.) G. Arnaud, to be an *Asterolibertia* species, *A. myocoproides* (Sacc. & Berl.) Arx. They therefore treated *Wardina* (together with *Steyaertia* Bat. & H. Maia) as synonyms of *Asterolibertia*.

Batista & Maia (1960a,b) recorded *Cirsosia moquileae* and *Wardina moquileae* on leaves of *Moquilea tomentosa* Benth. [≡ *Licania tomentosa* (Benth.) Fritsch] (*Chrysobalanaceae*) in the State of Pernambuco, Brazil. The type specimens of both species were examined at URM herbarium and found to be conspecific. Both names were published in 1960, but *Cirsosia moquileae* (Batista & Maia 1960a; = Publ. Inst. Micol. Univ. Recife 225) has priority over *Wardina moquileae* (Batista & Maia 1960b; = Publ. Inst. Micol. Univ. Recife 230). The genus *Cirsosia* is distinguished from *Wardina/Asterolibertia* by possessing linear ascomata (Arnaud 1918, Müller & Arx 1962, Arx & Müller 1975, Bezerra 2004, Kirk et al. 2008, Hosagoudar 2010). However, *C. moquileae* was described by Batista as having orbicular ascomata, and this was confirmed by our examination of the type material.

The fungus on leaves of *Licania tomentosa*, referred to in the literature as *Cirsosia moquileae* and *Wardina moquileae*, cannot sensibly be retained in either of those genera. As mentioned above, its orbicular ascomata are incompatible with *Cirsosia,* and the genus *Wardina* is now treated as a synonym of *Asterolibertia* (Müller & Arx 1962, Bezerra 2004, Kirk et al. 2008, Hosagoudar 2010). Based on revision of the *C. moquileae* and *W. moquileae* types and other specimens from Amapá and Pernambuco deposited in URM herbarium, complemented by analysis of the literature and examination of fresh specimens collected in the State of Bahia, Brazil, we redescribe the species and transfer it to *Asterolibertia*.

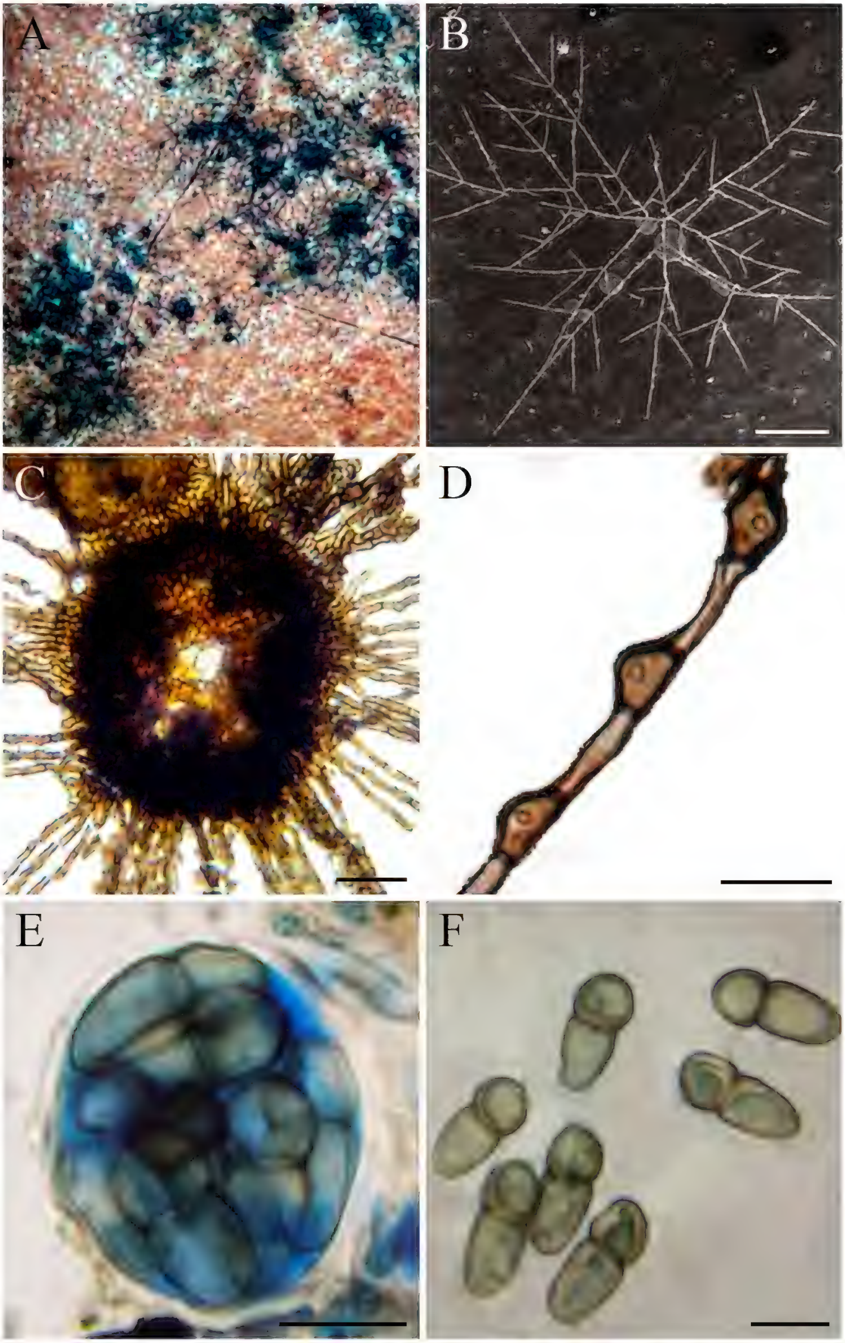
Materials & methods

Leaves of *Licania tomentosa* parasitised by an epiphytic, superficial, black fungus were collected in the municipalities of Ilhéus and Itabuna and studied microscopically in the Plant Pathology Laboratory of the Universidade Estadual de Santa Cruz (UESC), Ilhéus, Bahia, Brazil. Slides were made with lactophenol cotton-blue and the structures were characterized and photographed under light and scanning electric microscopes. Species identification was accomplished based on the publications of Arnaud (1918), Hansford (1949), Müller & Arx (1962), Luttrell (1973), Arx & Müller (1975), Hosagoudar & Abraham (1997), and Hosagoudar (2010). The new specimens were conserved in the Herbarium, Centro de Pesquisas do Cacau, Itabuna, Bahia, Brazil (CEPEC-Fungi).

Taxonomy

Asterolibertia moquileae (Bat. & H. Maia) J.L. Bezerra, Firmino,
S.P.B Araújo & Jad. Pereira, **comb. nov.** Figs 1, 2
MycoBank MB805756

Fig. 1 *Asterolibertia moquileae* (CEPEC-Fungi 2387). A. colonies on leaves of *Licania tomentosa*. B. superficial mycelium. C. ascoma with stellar dehiscence. D. hyphopodia intercalary, noduliform. E. bitunicate ascus. F. 1-septate mature ascospores. Bars: B = 200 µm; C = 50 µm; D = 20 µm; E, F = 10 µm.


A
B
C
D
E
F

≡ *Cirsosia moquileae* Bat. & H. Maia, Revista Biol. (Lisbon) 2(2): 121. 1960.
= *Wardina moquileae* Bat., Ann. Hist.-Nat. Mus. Natl. Hung. 52: 115. 1960.

Sexual morph: Colonies generally epiphyllous, rarely hypophyllous, black, flat, subcircular to irregular, isolated to confluent, 2.5–7 mm diam. Mycelium superficial, formed by dark brown, septate, straight to sub-straight, branched, anastomosed (teleomorphic) hyphae 15–22 × 4.5–5 µm. Hyphopodia (appressoria) intercalary, noduliform, unicellular, 10 × 7.5–10 µm. Ascomata tyriothecium-like, orbicular, applanate to dimidiate, black, opening by stellar to irregular dehiscence with fimbriate margins, 112.5–252 µm diam.; upper wall formed by rectangular, radiate cells. Asci subglobose, 8-spored, bitunicate, sessile, parallel arranged in the hymenium, 28–42 × 24–39 µm; pseudoparaphyses filamentous, simple or branched, embedded in a gelatinous matrix. Ascospores conglobate, brown at maturity, 1-septate, constricted at the septum, smooth, oblong, rounded at the ends, 21–23.5 × 5–9 µm with the upper cell broader than the lower.

Asexual morph: Pycnothyria numerous, circular, dimidiate, fringed at the borders, smaller than the ascomata with a central ostiole. Conidiogenous cells monoblastic, formed in the inner layer of the scutellum. Conidia 1–2 cells, ellipsoid, elongate, hyaline to olivaceous, 24–26 × 6–7 µm.

Specimens examined — **BRAZIL. Amapá**: Macapá, Serra do Navio, on leaves of *Licania tomentosa*, 22.VIII.1961, J.A. Lima (URM 28819, as *W. moquileae*). **Bahia**: Ilhéus, Campus da UESC, 14°47′46″S 39°10′28″W, on leaves of *L. tomentosa*, 26.VIII.2010, S.P.B. Araújo & J.L. Bezerra (CEPEC-Fungi 2219); Ilhéus, CEPLAC/SUEBA, 14°47′7″S 39°13′22″W, on leaves of *L. tomentosa*, 10.XI.2012, S.P.B. Araújo & J.L. Bezerra (CEPEC-Fungi 2387). **Pernambuco**: Vitória de Santo Antão, on leaves of *L. tomentosa*, 2.I.1958, A.C. Batista (URM 12570, holotype of *Wardina moquileae*); Paudalho, Chã de Capoeira, 18.IV.1959, O. Soares (URM 16146, as *C. moquileae*); Recife, Casaforte, on leaves of *L. tomentosa*, 22.IV.1956, S.J. da Silveira (URM 5470, holotype of *Cirsosia moquileae*); 22.IV.1956, S.J. da Silveira (URM 5471, 5471A, as *C. moquileae*); Recife, Dois Irmãos Ecological Reservation, on leaves of *L. tomentosa*, 3.IV.1960, J.L. Bezerra (URM 19795, as *W. moquileae*); 18.V.1966, J.L. Bezerra (URM 57001, as *W. moquileae*); 6.IX.1969, J.L. Bezerra (URM 71036, as *W. moquileae*); 18.IX.1969, J.L. Bezerra (URM 71041, as *W. moquileae*).

Notes: Seven species of *Asterolibertia* have been reported in association with chrysobalanaceous hosts: *Asterolibertia couepiae* on living leaves of *Couepia grandiflora* (Mart. & Zucc.) Benth. ex Hook. f. from Brazil; *A. nodulifera* (Syd. & P. Syd.) T.A. Hofmann on living leaves of *Angelesia splendens* Korth. from

Fig. 2 *Asterolibertia moquileae* (CEPEC-Fungi 2387). A, B. pycnothyria showing radiate wall and ostiole. C. detail of ostiole. D, E. hyphopodia intercalary. F. conidium. Bars: A, B = 50 µm; D = 20 µm; C, E, F = 10 µm.

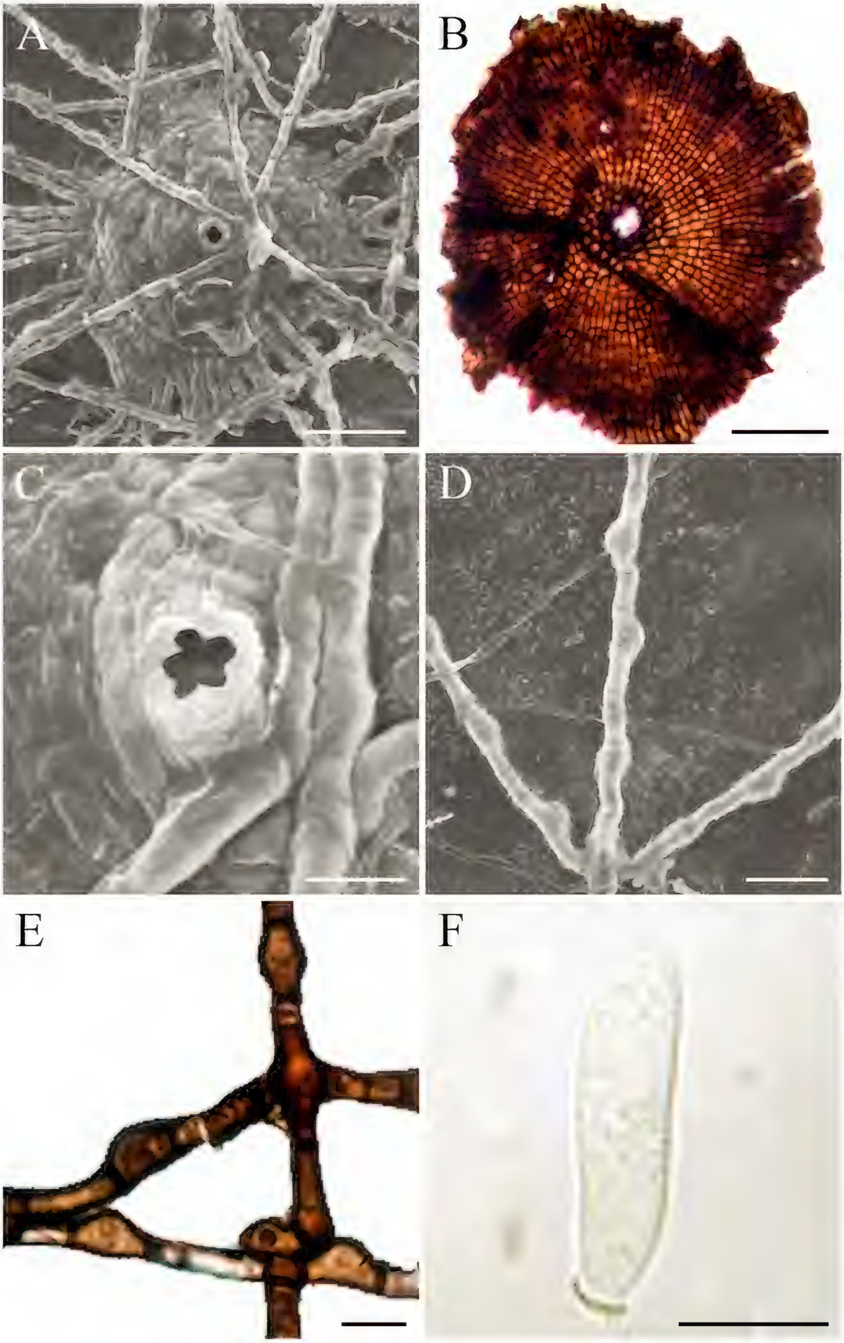

A
B
C
D
E
F

TABLE 1. Biometric data of *Asterolibertia* species on *Chrysobalanaceae*.

SPECIES	ASCOMATA (µm)	HYPHAE (µm)	APPRESSORIA (µm)	ASCI (µm)	ASCOSPORES (µm)
A. couepiae	150–200	6–8	—	30–35 × 26–32	16–24 × 8–13
A. licaniae	≤450 × 300	6–9	7–13 × 9–13	—	30–33 × 18–20
A. licaniicola	170	4–5	9–11 × 6–7	—	24–28 × 12–15
A. moquileae	112.5–252	4.5–5	15–22 × 4.5–5	28–42 × 24–39	21–23 × 5–9
A. nodulifera	320–420	4.5–7	9–13 × 8–12	33–36 × 13–15	33–36 × 13–16
A. parinarii	130–160	3–4.5	6.5–7.5 × 5–6	30–38 × 25–35	18–22.5 × 5–6
A. peruviana	200	4–6	4–6 diam.	—	17 × 8
A. schroeteri	220–300	6–8	10–13 diam.	60–70 × 42–46	38–42 × 11–13

Philippines; *A. licaniae* (Cooke) Hansf. and *A. licaniicola* Hansf. on living leaves of *Licania* sp. from Brazil; *A. parinarii* (Syd.) Hansf. on living leaves of *Parinari subcordata* Oliv. [= *P. congensis* Didr.] from Congo; *A. peruviana* Hansf. on living leaves of *Licania macrophylla* Benth. from Brazil; and *A. schroeteri* (Rehm) Arx on living leaves of *Chrysobalanus icaco* L. from West Indies (Arnaud 1918; Hansford 1947, 1949, 1955; Müller & Arx 1962; Hosagoudar 2010; Hofmann & Piepenbring 2014; Farr & Rossman 2015).

Asterolibertia moquileae differs from *A. couepiae* by its subglobose to oblong asci; from *A. nodulifera* by its larger thyriothecia and ascospores, smaller appressoria, echinulate ascospores and lack of pseudoparaphyses; from *A. licaniae* by its larger thyriothecia, hyphae and ascospores, smaller appressoria and lack of paraphyses; from *A. licaniicola* by its larger ascospores and smaller appressoria; from *A. parinarii* by its smaller appressoria; from *A. peruviana* by its narrower appressoria without any lateral protuberance and smaller ascospores; and from *A. schroeteri* by its larger hyphae, asci and ascospores, smaller appressoria and lack of paraphyses (Arnaud 1918; Hansford 1947, 1949, 1955; Müller & Arx 1962; Hofmann & Piepenbring 2014), as shown in TABLE 1. There are no other *Asterolibertia* species reported on *L. tomentosa*. Pycnothyria were observed in our material, but following the current application of 'One fungus/one name' no separate name is proposed for this morph.

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